Nexus 1000v

PACUG

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Presentation Overview

- Assumptions
  - You already know something about VMWare as this is not a guide to explain it.
  - You have some level of network experience and understand VLANs, trunks, uplinks, etc.

- What this is
  - An overview and collection of information to get you started
  - References to published documentation, everything said within this document is not 100% mine, some of the text and pictures are from Cisco or VMWare documentation. See Appendix for links to the documentation

- What this is **NOT**
  - All of the answers
  - Certified by Cisco
  - Certified by VMWare

Product Overview

Cisco Nexus™ 1000V Series Switches are virtual machine access switches that are an intelligent software switch implementation for VMware vSphere environments running the Cisco® NX-OS Software operating system. Operating inside the VMware ESX hypervisor, the Cisco Nexus 1000V Series supports Cisco VN-Link server virtualization technology to provide:

- Policy-based virtual machine connectivity
- Mobile virtual machine security and network policy
- Non-disruptive operational model for your server virtualization and networking teams

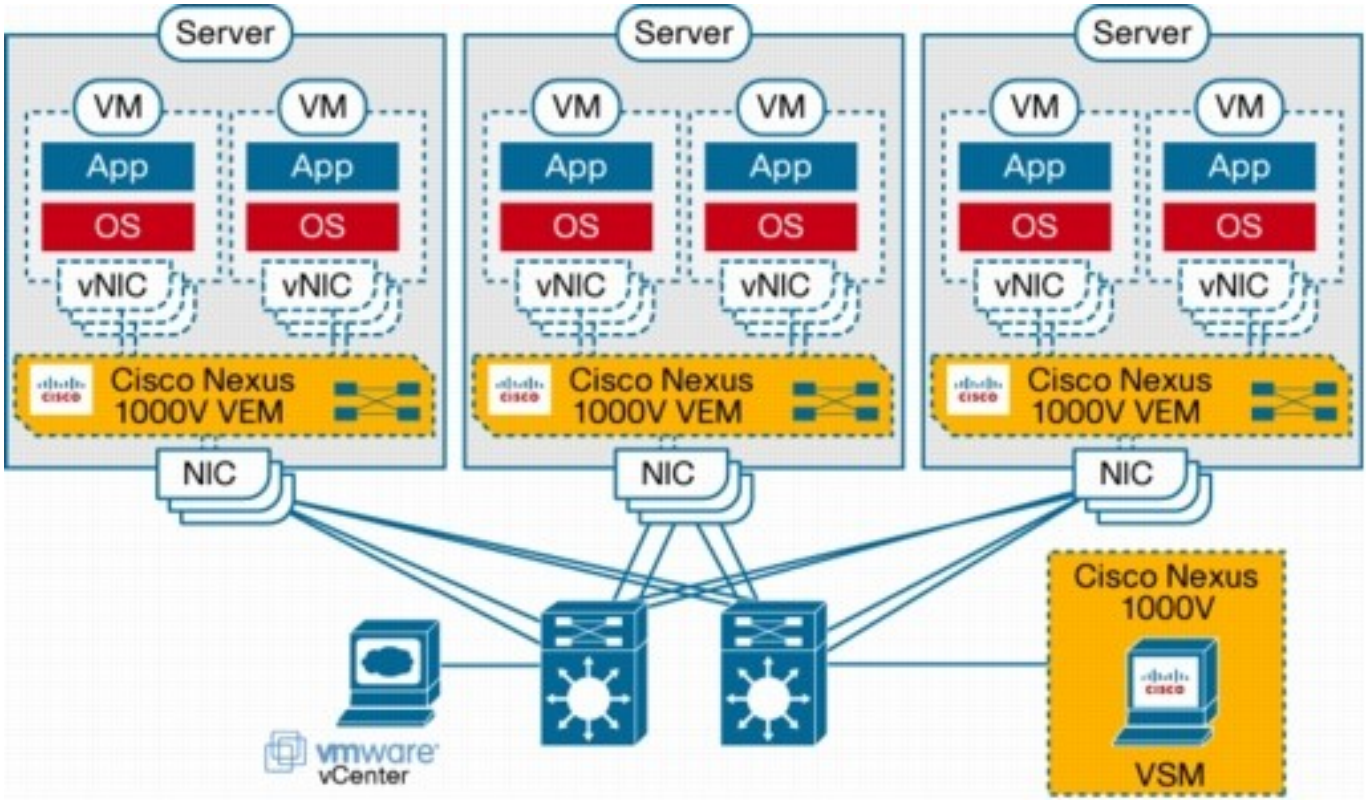
Bottom Line: Using the Nexus 1000v distributed switch model virtualizing the switching environment will allow you circumvent issues associated with Physical NIC types in different server platforms.

Components

Cisco Nexus™ 1000V consists of two parts

- VSM – Virtual Supervisor Module
  - VSM controls multiple VEMs as one logical modular switch.
  - Configuration is performed through the VSM and is automatically propagated to the VEMs.
  - One VSM can manage up to 64 VEMs
  - Cisco recommends having two VSMs configured as a pair to act as a two SUP switch
- VEM – Virtual Ethernet Module
  - VEM runs as part of the VMware ESX or ESXi kernel and replaces the VMware virtual switch (vSwitch).

Layout


Server
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1000V VEM
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1000V VEM
NIC
Cisco Nexus
1000V
VSM
vmware
vCenter

Distributed Switch Models

Figure 5 - Cisco Nexus 1000V with vSS Environment

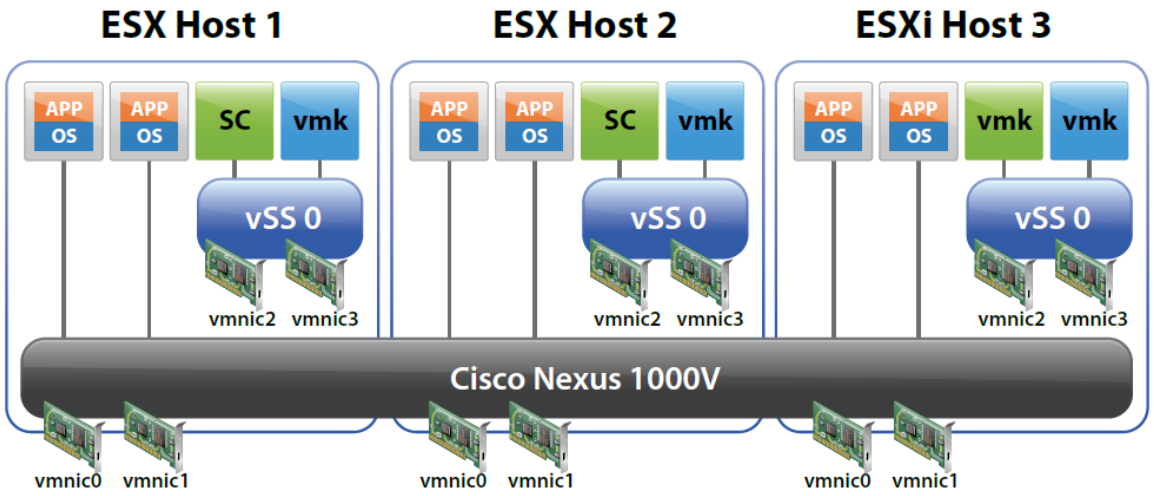
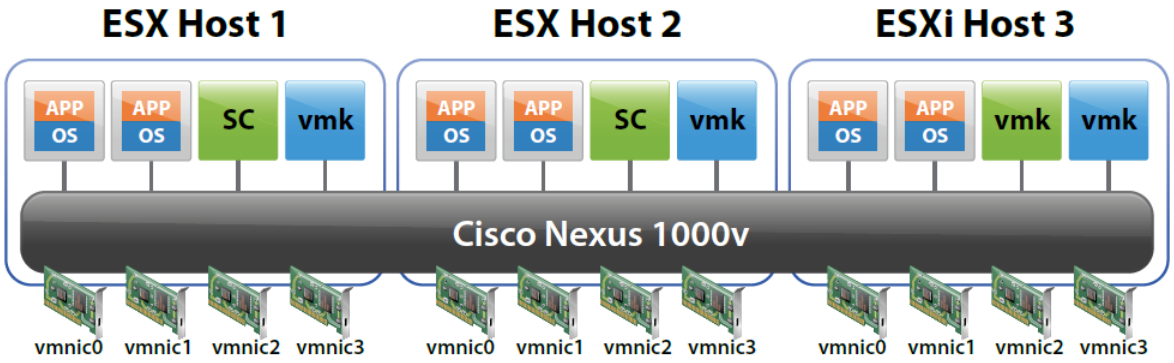
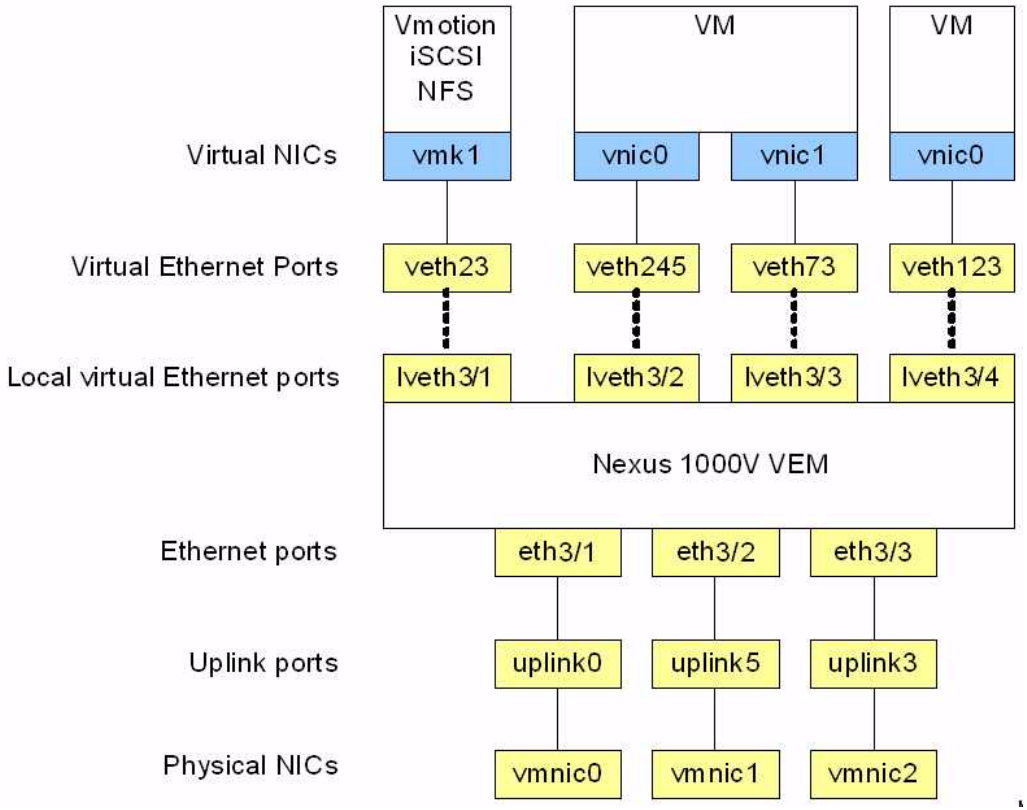


Figure 6 - Single Cisco Nexus 1000V Environment



Ethernet/NIC View



System Requirements

- VMware vSphere 4.0 or later with vNetwork Distributed Switch
  - Currently only supported with the VSphere Enterprise Plus license
- Cisco Nexus 1000V Series VSM:
  - VSM can be deployed as a virtual machine on VMware ESX or ESXi 3.5U2 or higher or ESX or ESXi 4.0
  - Hard disk: 3 GB
  - RAM: 2 GB
  - 1 virtual CPU at 1.5 GHz
- Cisco Nexus 1000V Series VEM
  - VMware ESX or ESXi 4.0
  - Hard disk space: 6.5 MB
  - RAM: 150 MB
  - Number of VLANs connecting VSM and VEM
  - Minimum: 1
  - Recommended: 3
  - Server on VMware Hardware Compatibility List (http://www.vmware.com/go/hcl)
  - Compatible with any upstream physical switches, including all Cisco Nexus and Cisco Catalyst® switches as well as Ethernet switches from other vendors

Licensing

The Cisco Nexus 1000V Series is licensed based on the number of physical CPUs on the server on which the VEM is running. Up to 12 Cores per CPU.

Part Number	Description
N1K-VSMK9-404S1-P=	Nexus 1000V VSM on Physical Media
N1K-VLCPU-01=	Nexus 1000V Paper CPU License Qty 1-Pack
N1K-VLCPU-04=	Nexus 1000V Paper CPU License Qty 4-Pack
N1K-VLCPU-16=	Nexus 1000V Paper CPU License Qty 16-Pack
N1K-VLCPU-32=	Nexus 1000V Paper CPU License Qty 32-Pack
L-N1K-VLCPU-01=	Nexus 1000V eDelivery CPU License Qty 1-Pack
L-N1K-VLCPU-04=	Nexus 1000V eDelivery CPU License Qty 4-Pack
L-N1K-VLCPU-16=	Nexus 1000V eDelivery CPU License Qty 16-Pack
L-N1K-VLCPU-32=	Nexus 1000V eDelivery CPU License Qty 32-Pack

Setup

- Read the Step by step guide before you start setting up your 1000v

http://www.cisco.com/en/US/docs/switches/datacenter/nexus1000/sw/4_0/install/software/guide/install_n1000v.html

Cisco recommended VLANs

- Management
  - Managing the VSM
- Packet
  - Used for protocols such as CDP, LACP
- Control
  - Communication between VSM & VEM
  - Netflow exports from VEM to VSM then exported to Netflow collector
  - VEM notification to VSM for port info

Nuts and Bolts

- Have more than one VMWare service console configured (It is interesting when you disconnect yourself…)
- Each VSM and VEM are like line cards in a switch
  - Slots 1 & 2 are VSM
  - 3 – 64 are VEMs (Slots are based on the order the server/VEM is added to the switch)
  - The VSM keeps the VEM slot order by VEM UUID
  - Virtual Ethernet ports are setup for the switch ports (See Ethernet/NIC View)
  - Port profiles are configuration information for switch ports that the VM guests connect to

  VMWare note on scaling :
    - Scaling maximums should be considered when migrating to a vDS. The following virtual network configuration maximums are
      - supported in the first release of vSphere 4
      - 64 ESX/ESXi Hosts per vDS
      - 16 Distributed Switches (vDS or Nexus 1000V) per vCenter Server
      - 512 Distributed Virtual Port Groups per vCenter Server
      - 6000 Distributed Virtual Switch Ports per vCenter
      - 4096 total vSS and vDS virtual switch ports per host
      - Note: These configuration maximums are subject to change.
- VSM and VEM need to be Layer 2 connected
- After you setup the VSM, but before adding a VEM to it, you need to configure at very least the uplink port profile in the Nexus 1000v
- Connecting initial VSM and VEM together
  - associate VSM to VMWare vSwitch on second uplink then connect the VEM to VSM
- Decide on and configure VSM VLANs
  - Management, Control, Packet
- Double check that you have a trunk configured on the port connecting you to the upstream switch
- The above VLANs are allowed on the trunk
- License your installs

Commands

- ESX Host
  - esxcfg-vswitch
  - esxcfg-vswif
  - esxcfg-vmknic
- ESX Host with VEM installed (There may be a way to run these from the VSM with the module command, but I have yet to use it)
  - vemcmd show port
  - vemcmd show trunk
- Nexus VSM
  - Show module
  - Show module vem mapping
  - Show port-profile usage
  - Show interface brief

Appendix:

- http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns892/ns894/at_a_glance_c45-492852.pdf
- http://www.cisco.com/en/US/docs/switches/datacenter/nexus1000/sw/4_0/install/software/guide/install_n1000v.html
- http://www.cisco.com/en/US/prod/collateral/switches/ps9441/ps9902/data_sheet_c78-492971.html
- http://www.vmware.com/products/vsphere/buy/editions_comparison.html
- http://ciscosystems.com/en/US/docs/switches/datacenter/nexus1000/sw/4_0/troubleshooting/configuration/guide/trouble_8layer2.pdf
- http://www.cisco.com/en/US/prod/collateral/switches/ps9441/ps9902/solution_overview_c22-526262.pdf
- http://www.vmware.com/files/pdf/vsphere-vnetwork-ds-migration-configuration-wp.pdf

- Not covered in PPT, but KB just came out at the time of this presentation. http://kb.vmware.com/kb/1014977